

What is Claimed Is:

1. A method of spraying an aerosol spray, comprising:

providing a nozzle and an electrode separated by a predetermined distance;

5 placing said electrode at a high electrical potential relative to said nozzle, either of positive or negative polarity, thereby creating an electric field between said nozzle and said electrode;

ejecting a liquid or powder from said nozzle towards said electrode to atomize the ejected liquid or powder into aerosol droplets or particles so that in the applied electric field between said nozzle and said electrode, said electrode being at a
10 predetermined distance from said aerosol droplets or particles, said aerosol droplets or particles obtaining an induced electric charge, which is of the same polarity as the high voltage electrode, and

after the aerosol droplets or particles pass the vicinity of said electrode,
15 forming a directed spray of aerosol droplets or particles having a desired shape and with sufficient momentum and electric charge so that said directed spray of aerosol droplets or particles is deposited on a target.

2. A method of spraying an aerosol spray, comprising:

20 providing a nozzle and an electrode separated by a predetermined distance;

placing said electrode at a high electrical potential relative to said nozzle, either of positive or negative polarity, thereby creating an electric field between said nozzle

and said electrode;

ejecting a liquid or powder from said nozzle towards said electrode to atomize the ejected liquid or powder into aerosol droplets or particles so that in the applied electric field between said nozzle and said electrode, said electrode being at a predetermined distance from said aerosol droplets or particles, said aerosol droplets or particles obtain an induced electric charge, which is of the opposite polarity as the high voltage electrode, and

after the aerosol droplets or particles pass the vicinity of said electrode, forming a directed spray of aerosol droplets or particles having a desired shape and with sufficient momentum and electric charge so that said directed spray of aerosol droplets or particles is deposited on a target.

3. A method of spraying an aerosol spray, comprising:

providing a grounded nozzle and an electrode separated by a predetermined distance;

providing a grounded conductive cover around said nozzle and said electrode, said cover having an opening that allows a directed spray to exit;

placing said electrode at a high electrical potential relative to said nozzle, thereby creating an electric field between said nozzle and said electrode;

ejecting a liquid or powder from said nozzle towards said electrode to atomize the ejected liquid or powder into aerosol droplets or particles so that in the applied electric field between said nozzle and said electrode, said aerosol droplets or particles

obtain an induced electric charge, which is of the same polarity as the high voltage electrode, and

after the aerosol droplets or particles pass the vicinity of said electrode, forming a directed spray of aerosol droplets or particles having a desired shape and with sufficient momentum and electric charge so that said directed spray of aerosol droplets or particles is deposited on a target.

4. A method of spraying an aerosol spray, comprising:

providing a grounded nozzle and an electrode separated by a predetermined distance;

providing a grounded conductive cover around said nozzle and said electrode, said cover having an opening that allows a directed spray to exit;

placing said electrode at a high electrical potential relative to said nozzle, thereby creating an electric field between said nozzle and said electrode;

ejecting a liquid or powder from said nozzle towards said electrode to atomize the ejected liquid or powder into aerosol droplets or particles so that in the applied electric field between said nozzle and said electrode, said aerosol droplets or particles obtain an induced electric charge, which is of the opposite polarity as the high voltage electrode, and

after the aerosol droplets or particles pass the vicinity of said electrode, forming a directed spray of aerosol droplets or particles having a desired shape and with sufficient momentum and electric charge so that said directed spray of aerosol

droplets or particles is deposited on a target.

5. The method of claim 3, wherein said liquid or powder has an electrical resistivity in the range of 200 Ohm-cm to 40 kilo-ohm-cm.

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6. The method of claim 4, wherein said liquid or powder has an electrical resistivity in the range of 200 Ohm-cm to 40 kilo-ohm-cm.

7. An apparatus to spray aerosol particles, comprising:

10 a spray gun having at least one electrically conductive and grounded nozzle;
 a pressure source to force powder or fluid through said nozzle wherein the
 exiting powder or fluid forms a stream of aerosol particles or droplets; and
 an electrode with high electric potential disposed at a distance from said nozzle
 and from said stream of aerosol particles or droplets, wherein the electric potential
15 creates an electric field that charges said stream of aerosol particles or droplets.

8. The apparatus according to claim 7, further comprising:

an electrical connection to said electrode; and

an insulating electrode holder surrounding said electrical connection to said electrode, said insulating electrode holder having a concave shape for preventing the formation of a continuous wetted surface between said electrode and a grounded surface.

9. The apparatus according to claim 8, wherein said electrode holder is made of a material with which said stream of aerosol particles or droplets has a low coherence force, i.e., the attraction force between the particles and the target.

10. The apparatus according to claim 7, wherein said electrode is not disposed close enough to the nozzle to permit electric charge to leak through said stream of sprayed aerosol particles or droplets before said stream of sprayed aerosol particles or droplets are fully separated or said electrode is disposed too far away from said nozzle that the electric field between said electrode and said nozzle is too low to induce electric charge in the said stream of sprayed aerosol particles or droplets.

11. The apparatus according to claim 7, further comprising:

an opening of said electrode dimensioned so that the distance between said electrode and said stream of sprayed aerosol particles or droplets does not permit the electric charge on said stream of sprayed aerosol particles or droplets to leak through

said stream of sprayed aerosols or too far so that the electric field is too low to induce the electric charge.

12. The apparatus according to claim 7, further comprising:

a grounded conductive cover surrounding said nozzle and said electrode.

5 13. The apparatus according to claim 7, further comprising:

a manifold;

a second nozzle mounted on said manifold; and

wherein said electrode has a shape adapted to provide the same distance between said electrode and said nozzle and said second nozzle.

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